

October 1999

**THE CONFEDERATED TRIBES OF THE WARM SPRINGS  
RESERVATION OF OREGON JOHN DAY BASIN OFFICE  
FY 1998 WATERSHED RESTORATION PROJECTS**

Annual Report 1998



DOE/BP-00000492-1



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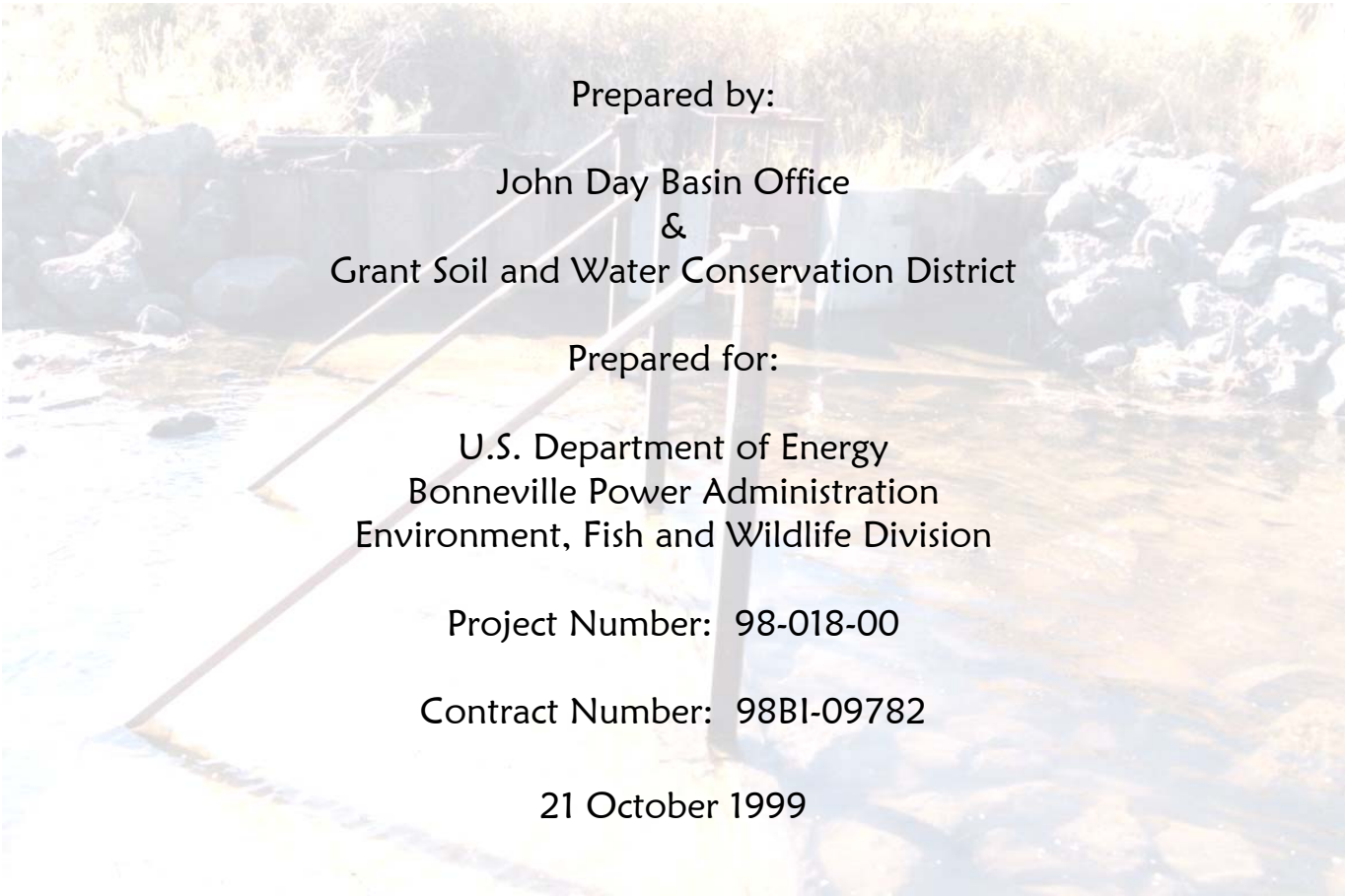
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# The Confederated Tribes of the Warm Springs Reservation of Oregon

## John Day Basin Office

FY 1998 Watershed Restoration Projects

### **Annual Report**



Prepared by:

John Day Basin Office  
&  
Grant Soil and Water Conservation District

Prepared for:

U.S. Department of Energy  
Bonneville Power Administration  
Environment, Fish and Wildlife Division

Project Number: 98-018-00

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21 October 1999

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## Abstract

The John Day River is the second longest free-flowing river in the contiguous United States and one of the few major subbasins in the Columbia River basin containing entirely unsupplemented runs of anadromous fish. Located in eastern Oregon, the basin drains over 8,000 square miles, the fourth largest drainage area in Oregon. With its beginning in the Strawberry Mountains near the town of Prairie City, the John Day flows 284 miles in a northwesterly direction, entering the Columbia River approximately four miles upstream of the John Day dam. With wild runs of spring chinook salmon and summer steelhead, red band, westslope cutthroat, and redband trout, the John Day system is truly one of national significance.

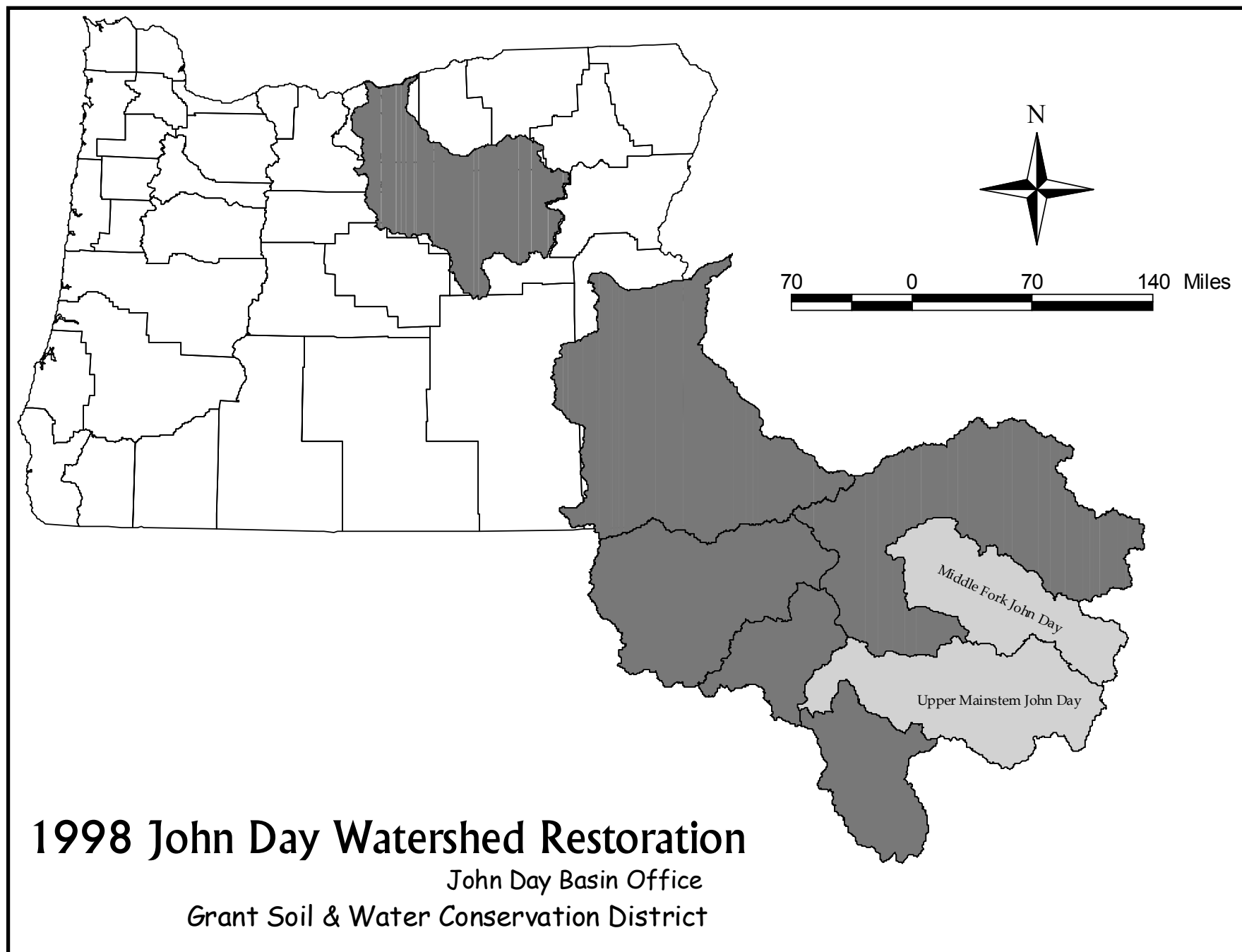
The entire John Day basin was granted to the Federal government in 1855 by the Confederated Tribes of the Warm Springs Reservation of Oregon (Tribes). In 1997, the Tribes established an office in the basin to coordinate restoration projects, monitoring, planning and other watershed activities on private and public lands. Once established, the John Day Basin Office (JDBO) initiated contracting the majority of its construction implementation actions with the Grant Soil and Water Conservation District (GSWCD), also located in the town of John Day.

The GSWCD completes the landowner contact, preliminary planning, engineering design, permitting, construction contracting, and construction implementation phases of the projects. The JDBO completes the planning, grant solicitation/defense, environmental compliance, administrative contracting, monitoring, and reporting portion of the program. Most phases of project planning, implementation, and monitoring are coordinated with the private landowners and basin agencies, such as the Oregon Department of Fish and Wildlife and Oregon Water Resources Department.

In 1998, the JDBO and GSWCD proposed continuation of a successful partnership between the two agencies and basin landowners to implement an additional ten (10) watershed conservation projects. The types of projects implemented included installation of a tailwater collection and reuse system, infiltration galleries, permanent diversions, pumping stations, and irrigation upgrades.

Project costs in 1998 totaled \$891,504.00 with a total amount of \$300,329.00 (34%) provided by the Bonneville Power Administration (BPA) and the remainder coming from other sources such as the Bureau of Reclamation (BOR) and individual landowners.

**Figure 1. Map of the John Day Basin**



**Figure 2. Upper Mainstem John Day River Project Location Map**

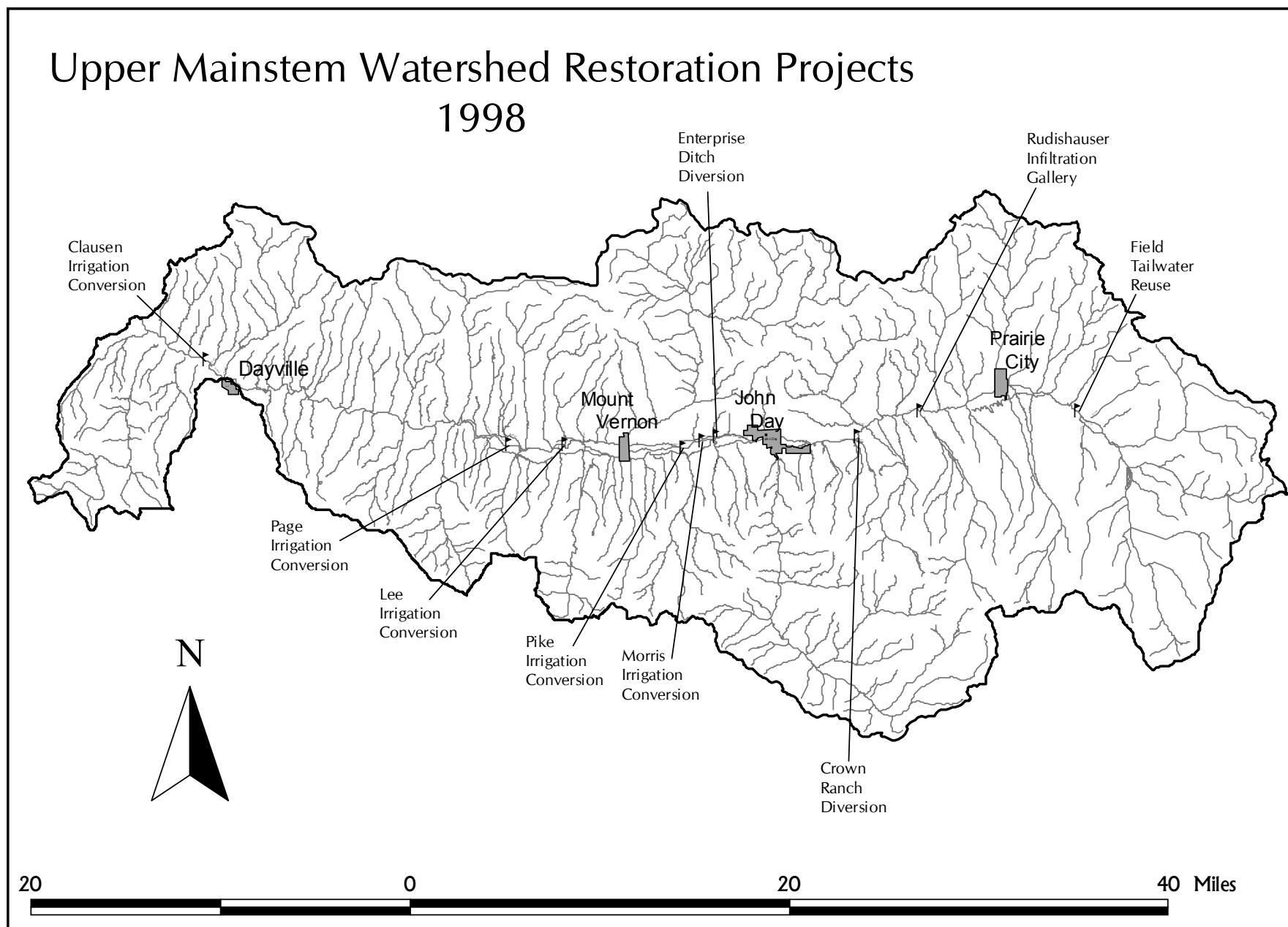
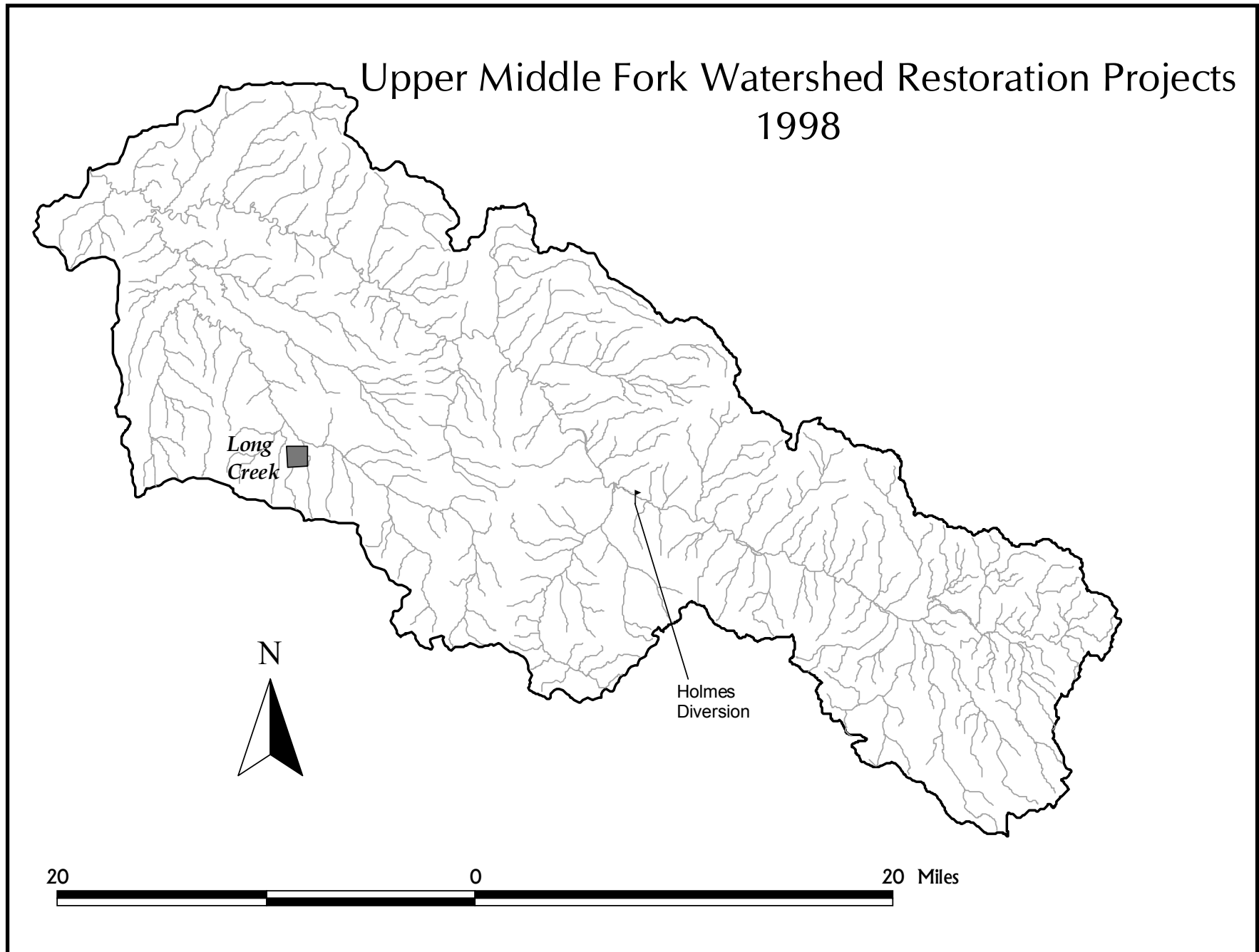




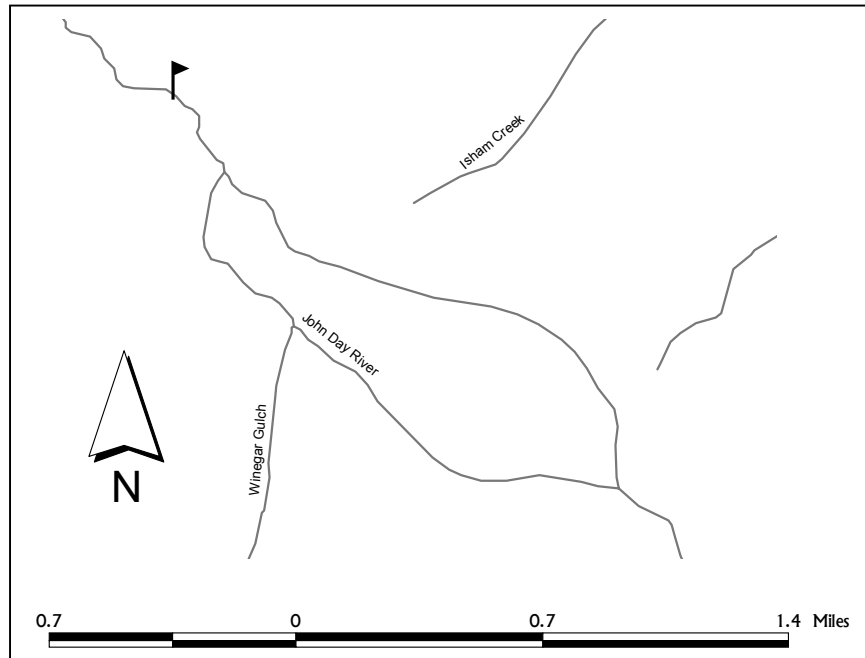
Figure 3. Upper Middle Fork Project Location Map



## Project Descriptions

**PROJECT: FIELD TAILWATER REUSE & INFILTRATION GALLERY**

**Grantee: Grant Soil and Water Conservation District**



**Figure 4. Field Project Location Map**

**Background:** The Field Tailwater Reuse and Infiltration Gallery Project is located on the Dick Field ranch, approximately 4.5 river miles (RM) east of the town of Prairie City. The project area consists of approximately 130 acres, historically irrigated as a single unit using surface flood methods. Two separate river diversions on the mainstem John Day River diverted approximately 3.25 cfs of water from 1 April to 30 October into an open conveyance and delivery system.

The open water distribution system resulted in high conveyance losses and caused

continual maintenance of the field ditches. Uneven application of water in portions of the field led to ponding and distribution of undesirable grass species over some of the project lands. Concentrated return flows, collected as irrigation tailwater, entered the John Day River with elevated (assumed) nutrient and thermal levels.

These tailwaters were a

**Photo 1. Pre-project photo of the Fields Diversion**

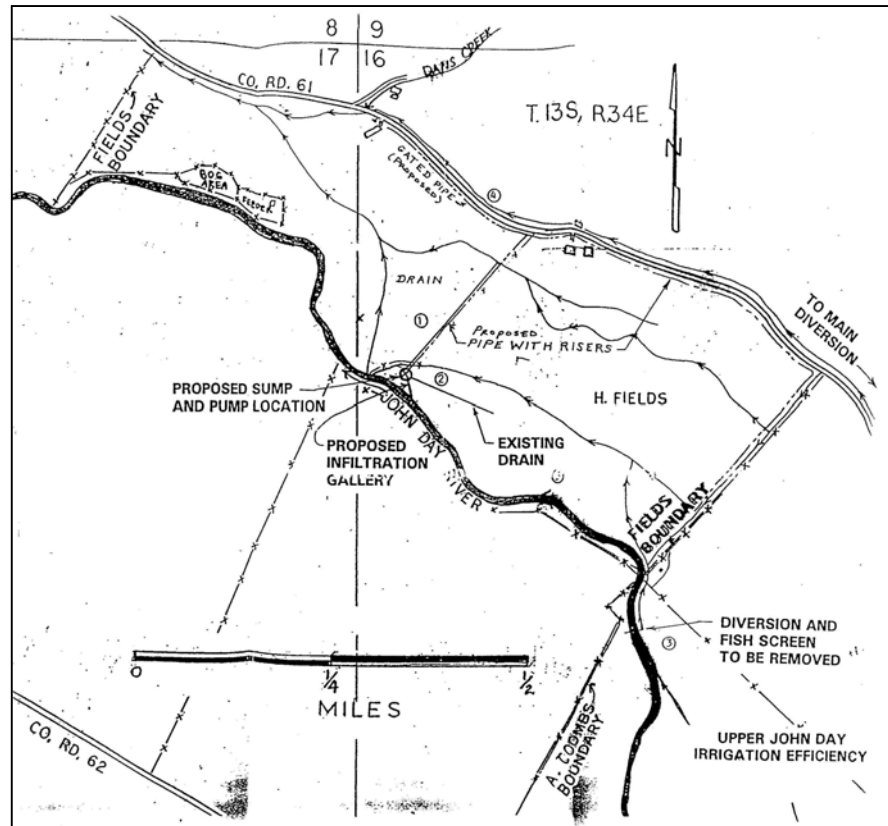
result of both upstream and on-farm application of irrigation water. A second diversion was necessary because of field topography, which led to an inefficient and ineffective application of irrigation water.

Streambed material used in the diversion dams was excavated as needed from the river channel and was left in place after the end of the irrigation season. In



addition, other materials, such as plywood, tin, and hay bales, were often used in dam construction (see Photo 1).

Seasonally high flows typically washed the diversion away causing it to be rebuilt annually. Sporadic summer storm events and gradual flow reduction caused the dam to be reconstructed or reinforced on an irregular basis throughout the irrigation season. The processes of dam construction and reconstruction several times each year led to destabilization of soil tension which resulted in increased bedload transport and scouring of the riverbed. The periodic use of heavy equipment in the river for maintenance and construction may have resulted in additional streambank/bed and riparian destabilization. In addition, the push-up diversions may have been fish passage impediments or barriers, in particular during periods of low river flow.



**Figure 5. Fields Project Facility Map**

The Fields project area is located within primary spawning and rearing habitat for spring chinook in the upper mainstem John Day River. Past project efforts on the Fields Ranch have focused on improvements in riparian and instream habitat and led to the construction of a full riparian corridor fence throughout the property.

#### Objectives:

1. Reduce the overall number of diversions in the John Day basin and eliminate two potential fish passage obstructions within the project area.
2. Enhance instream flows within and downstream of the project area by increasing irrigation efficiency, decreasing overall diversion rates, reducing conveyance losses, and by moving the point of diversion 0.7 miles downstream from the existing location.
3. Eliminate direct and indirect impacts to riparian areas and streambed/banks associated with the annual and periodic reconstruction of the push-up diversions, thereby enhancing channel stability.
4. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversions.
5. Reduce the Oregon Department of Fish and Wildlife's ongoing screen maintenance effort.
6. Reduce or eliminate concentrated warm water return flows to the John Day River within the project area.
7. Enhance agricultural yields and reduce overhead costs associated with irrigation management.





**Photo 2. Well screens being installed at the Fields project**

**Project Description:**

1. Install a tailwater collection system consisting of buried pipe to gather and convey return flows from the irrigated field to a pump.
2. Move diversion point approximately .7 miles downstream from the present location.
3. Install a water delivery system, consisting of a buried PVC mainline, pump, risers, wheelline, and handlines. In addition, convert a portion of the earth lined ditches to a gated pipe delivery system. Configure the project to irrigate all of the project lands using the tailwater collected, delivered to, and returned from the pumping station.
4. Install an infiltration gallery, in the river and near the pump location, to gravity-feed river water to the pump when there is insufficient tailwater to satisfy the legal rate and duty for water.
5. Eliminate the second river diversion, fish screen, and the shared ditch where it enters the upstream farm boundary. Reclaim the abandoned ditch where necessary.

**Monitoring:**

**Monitoring Objective:** Evaluate the general rate of channel and riparian recovery.

**Monitoring Elements:**

1. Establish permanent photo-point locations (using GPS and field markers), using pre-project photo locations where appropriate, to visually evaluate channel and riparian recovery.
2. Acquire pre-project photos from the GSWCD; repeat post-project photos.

**Photo 3. Post-project photo of Fields Infiltration Gallery**



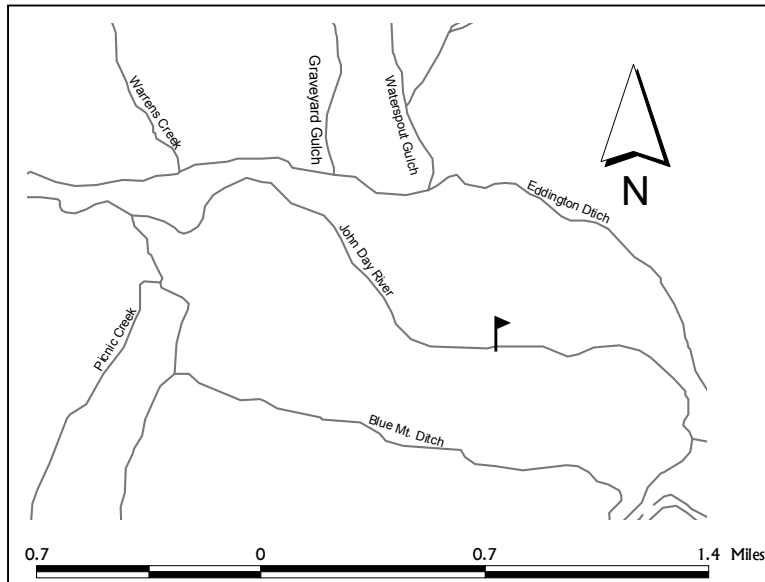
**Monitoring Completed:**

1. Pre- and post-project photos have been acquired from the GSWCD.

Project Cost:	Local Cost Share	114,075	(69%)
	BPA Contribution	<u>50,160</u>	(31%)
	TOTAL	\$ 164,235	

Start Date: July 1997Completion Date: December 1998**PROJECT: PAGE IRRIGATION CONVERSION**

Grantee: Grant Soil and Water Conservation District

**Figure 6. Page Project Location Map**

Background: The Page Irrigation Conversion Project is located approximately 7.25 RM west of the town of Mount Vernon. The project area consists of 95 acres of hay meadow adjacent to the John Day River. Historically, water from the Eddington Ditch was diverted from the John Day River, using a gravel push-up diversion, into an irrigation delivery network consisting of a system of open field ditches. Material used in the diversion dam was excavated as needed from the riverbed and was left in place after the end of the irrigation season.

Seasonally high flows typically washed the diversion away causing it to be rebuilt annually. Sporadic summer storm events and gradual flow reduction in the river caused the dam

to be reconstructed on an irregular basis. The processes of dam construction and reconstruction several times each year led to destabilization of soil tension which increased bedload transport and scouring of the riverbed. The periodic use of heavy equipment in the river for maintenance and construction may have resulted in additional streambank/bed and riparian destabilization. In addition, the diversion may have been a fish passage impediment or barrier, in particular during periods of low river flow.

The open water distribution system resulted in high conveyance losses and caused continual maintenance of the field ditches. Uneven field topography and water distribution led to patterns of undesirable grass species (lowering hay production) and areas of the meadow which were too wet to mow.<sup>i</sup>

The Project area is located within migratory habitat for anadromous salmonids. Previous work with the landowner has resulted in the construction of a riparian corridor fence on the mainstem as well as other fish and wildlife enhancement efforts.

**Objectives:**

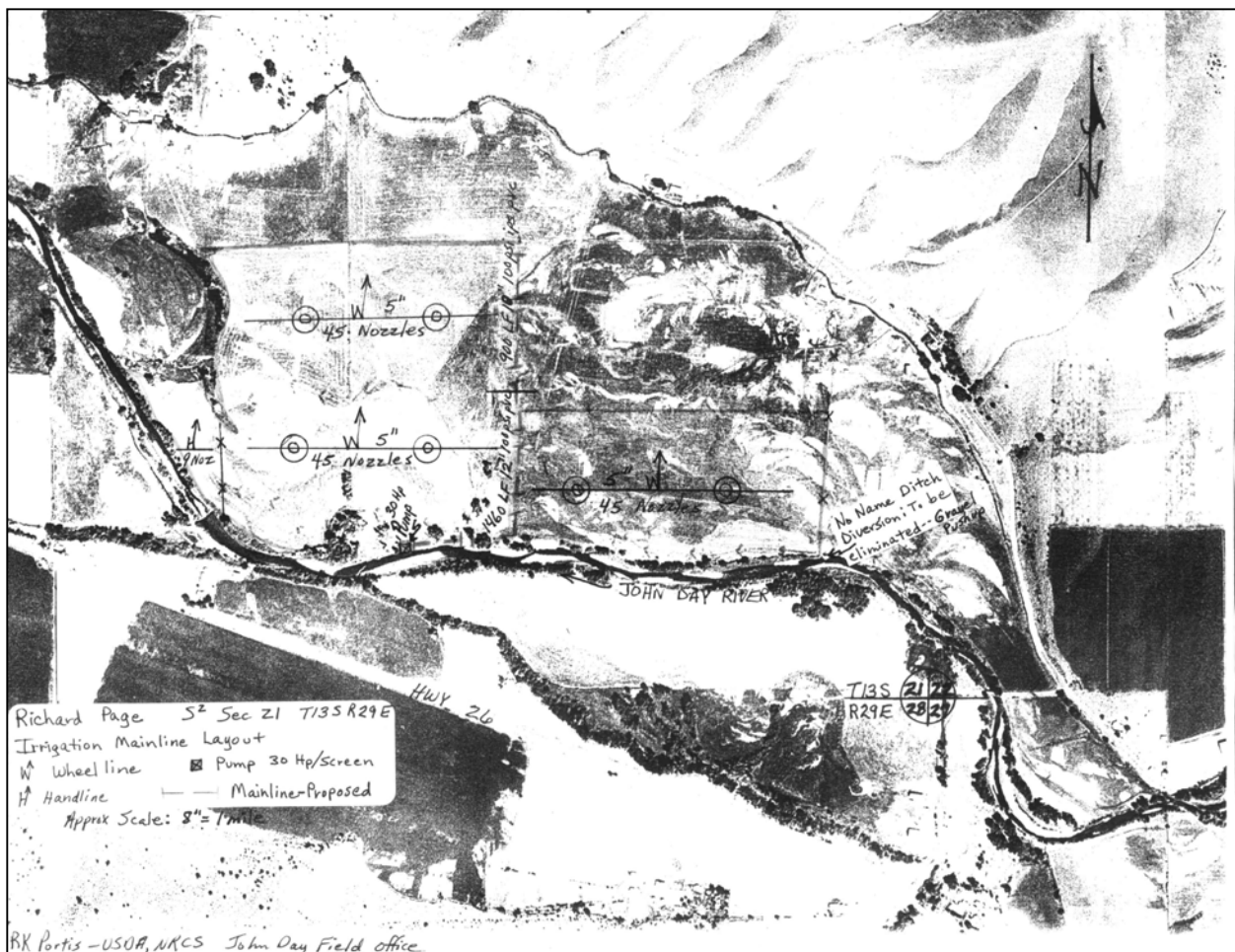
1. Reduce the overall number of diversions in the John Day basin and eliminate a potential fish passage obstruction within the project area.
2. Enhance instream flows within and downstream of the project area by increasing irrigation efficiency, decreasing overall diversion rates, reducing conveyance losses, and by moving the point of diversion ½ mile downstream from the existing point of diversion.

3. Eliminate direct impacts to riparian areas and streambed/banks (and resulting indirect impacts) associated with the annual and periodic reconstruction of the push-up diversion, thereby enhancing channel stability.
4. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversion.
5. Reduce the Oregon Department of Fish and Wildlife's ongoing screen maintenance effort.
6. Enhance agricultural yields and reduce overhead costs associated with irrigation management.

#### Project Description:

1. Move the diversion point approximately 2500 feet (0.5 miles) downstream of the present diversion point.
2. Install a 25 HP electric pump, with screened intake, at a newly constructed pumping facility.
3. Install a conveyance and delivery system consisting of approximately 1320 linear feet of 12" and 660 linear feet of 10" buried PVC mainline and 45 sections of 3-5" wheel line.
4. Restore and replant disturbed areas.

**Figure 7. Page Project Facilities Map**



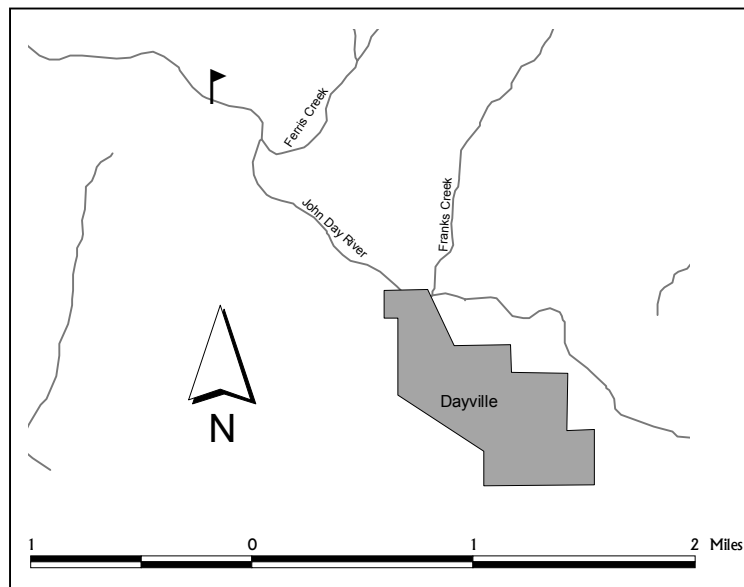
**Monitoring:****Monitoring Objective:** Evaluate the rate of channel and riparian recovery.**Monitoring Elements:**

1. Evaluate channel and riverbank structure, using channel cross sections<sup>ii</sup>, along approximately 100 meters of river beginning immediately above the old diversion dam. This assessment will be compared to the original engineering survey (if applicable) to determine extent and rate of channel correction.
2. Establish permanent photo-point locations (using GPS and field markers), using pre-project photo locations where appropriate, to visually evaluate channel and riparian recovery.
3. Acquire pre-project photos from the GSWCD; repeat post-project photos.

**Monitoring Completed:**

1. Pre- and post-project photos have been taken by the GSWCD.

Project Cost:	Local Cost Share	107,052	(78%)
	BPA Contribution	<u>29,840</u>	(22%)
	TOTAL	\$ 136,892	

Start Date: April 1997Completion Date: September 1997**PROJECT: CLAUSEN PUMPING STATION & IRRIGATION UPGRADE****Grantee: Grant Soil and Water Conservation District****Figure 8. Clausen Project Location Map**

**Background:** The Clausen Pumping Station Project is located approximately 1.0 RM west of the town of Dayville. Historically, Ringsmeyer Ditch water was diverted into an open canal by constructing a gravel dike across the John Day River. The project area consists of 410 acres, which receives 10.25 cfs of water during the irrigation season. Dike material was excavated from the river and streambed and was left in place following the end of the irrigation season. Subsequent high flows typically washed the dike away causing it to be rebuilt the following irrigation season. Annual flow reduction caused the dam to be rebuilt sporadically throughout the irrigation season. The process of dike reconstruction several times per year caused a gradual lowering of the

riverbed.

When it became difficult to obtain sufficient material to rebuild the dike, and as the streambed lowered, the diversion point was moved upstream. The latest diversion point was several hundred feet upstream from the designated point of diversion. This resulted in destabilization of the streambanks, river bed, and riparian area along a significant length of stream. Approximately 1600' of canal bank



was reconstructed using streambed gravel and much of the streambank was rebuilt several times each year. An open ditch carried the diverted flows approximately 3400' to the irrigated lands. The open canal led to high conveyance losses and continual maintenance of the ditch.

The project area is within migratory habitat for anadromous fish.

#### Objectives:

1. Reduce the overall number of diversions in the John Day basin and eliminate a potential fish passage obstruction within the project area.
2. Enhance instream flows within and downstream of the project area by increasing irrigation efficiency, decreasing overall diversion rates, reducing conveyance losses, and by moving the point of diversion 3200 feet (.6 miles) downstream from the existing point of diversion.
3. Eliminate direct impacts to riparian areas and streambed/banks (and resulting indirect impacts) associated with the annual and periodic reconstruction of the push-up diversion, thereby enhancing channel stability.
4. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversion.
5. Reduce the Oregon Department of Fish and Wildlife's ongoing screen maintenance effort.
6. Enhance agricultural yields and reduce overhead costs associated with irrigation management.

#### Project Description:

1. Move the point of diversion for the Ringsmeyer ditch approximately 3200 feet downstream.
2. Modify the diversion method from a dam to an electric pump, with facilities. Install a screened pump intake to prevent fish entrainment.
3. Convert the open canal to a buried pipe conveyance system. Install approximately 320 linear feet of 18", 700 linear feet of 4", and 365 linear feet of 3" buried PVC conveyance pipe with a stilling basin.

#### Monitoring:

**Monitoring Objective:** Evaluate the rate of channel and riparian recovery.

#### Monitoring Elements:

1. Evaluate channel and riverbank structure, using channel cross sections, along approximately 100 meters of river beginning immediately above the old diversion dam. This assessment will be compared to the original engineering survey (if applicable) to determine extent and rate of channel correction.
2. Photo 3. Post-project photo of Fields Infiltration Gallery
3. Establish permanent photo-point locations (using GPS and field markers), using pre-project photo locations where appropriate, to visually evaluate channel and riparian recovery.
4. Acquire pre-project photos from the GSWCD; repeat post-project photos.

#### Monitoring Completed:

1. Pre- and post-project photos have been acquired from the GSWCD.

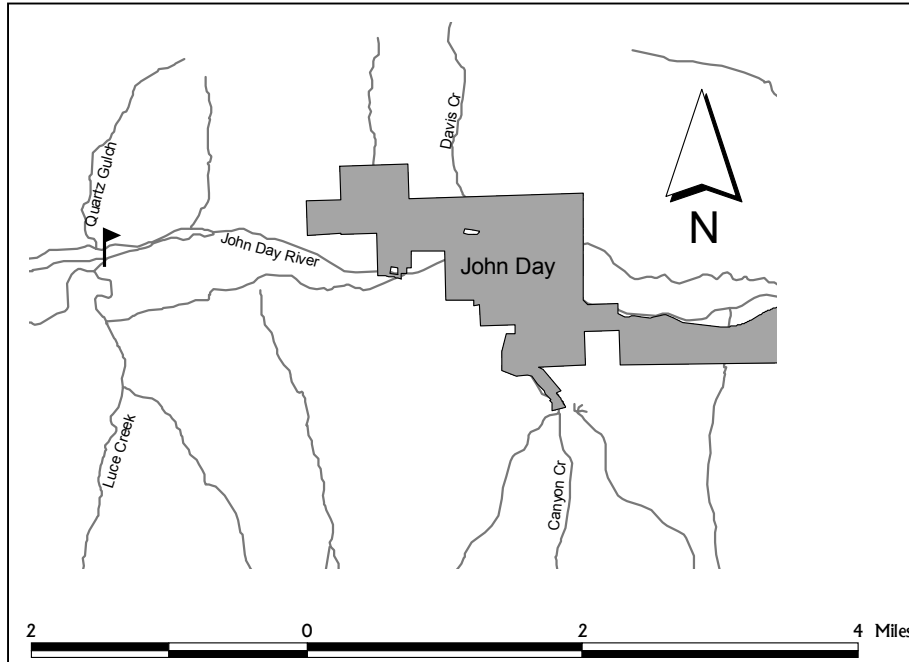
Project Cost:	Local Cost Share	96,572	(83%)
	BPA Contribution	<u>20,000</u>	(17%)



TOTAL \$ 116,572

Start Date: April 1997Completion Date: September 1998**PROJECT: ENTERPRISE DIVERSION**

Grantee: Grant Soil and Water Conservation District

**Figure 9. Enterprise Project Location Map**

Background: Currently, Enterprise ditch water is diverted into an open canal by constructing a gravel dike across the John Day River. The temporary gravel berm is reconstructed annually, and as required during the irrigation season, as river flows decline. Depending upon river flow condition, the diversion can become a partial to total barrier to migrating fish.

Dike Material is excavated from the riverbed and the dike is left in place following the end of the irrigation season. Subsequent high flows typically wash the dike

away causing it to be rebuilt the following irrigation season. The process of dike reconstruction, often several times per year causes a gradual lowering of the riverbed. This method of diversion practice requires periodic use of heavy equipment in the river to perform maintenance.

The chronic effects of construction and reconstruction of this type of diversion result in apparent destabilization of the stream bed and banks, which prohibits the establishment of riparian vegetation.

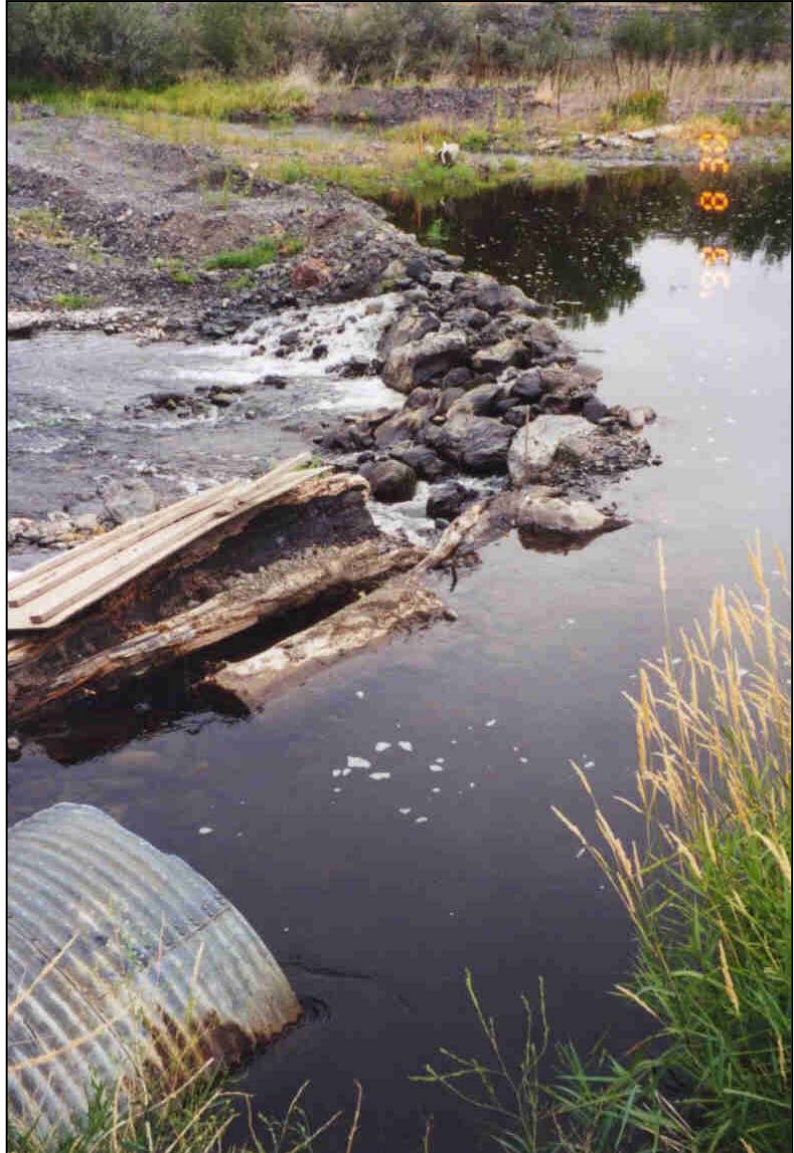
This project is located within the anadromous migratory corridor and known overwintering/migratory habitat for bull trout, westslope cutthroat, and redband trout. The project area also likely provides late spring/early summer rearing habitat for juvenile anadromous species.

**Objectives:**

1. Reduce the overall number of diversions in the John Day basin and eliminate a potential fish passage obstruction within the project area.
2. Eliminate direct impacts to riparian areas and streambed/banks (and resulting indirect impacts) associated with the annual and periodic reconstruction of the push-up diversion, thereby enhancing channel stability.
3. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversions.
4. Reduce overhead costs associated with irrigation management.

**Project Description:**

1. Install a permanent concrete and rock diversion structure with fish passage facilities.
2. Construct a concrete turnout box and spillway to protect the turnout box and a headgate.
3. Install layflat stanchions in spillway to allow for placement of flashboards that regulate impounded water levels during the irrigation season.
4. Place approximately 400 cubic yards of 42 inch minus riprap in conjunction with sheet steel piling in bed of the river on grade relative to the point of diversion to ensure flow over the fishway under all normally occurring river levels.
5. Incorporate the existing water measuring device and hydraulically powered fish wheel into the diversion system.
6. Stabilize the south bank of the stream as necessary with riprap to protect the installation and shape spoils for both banks.
7. Plant grasses and hardwoods on both banks to increase rate of vegetation recovery.
8. Rebuild the existing corridor fence.



**Photo 4. Pre-project photo of the Enterprise Diversion**

**Monitoring:**

**Monitoring Objective:** Evaluate the rate of channel and riparian recovery.

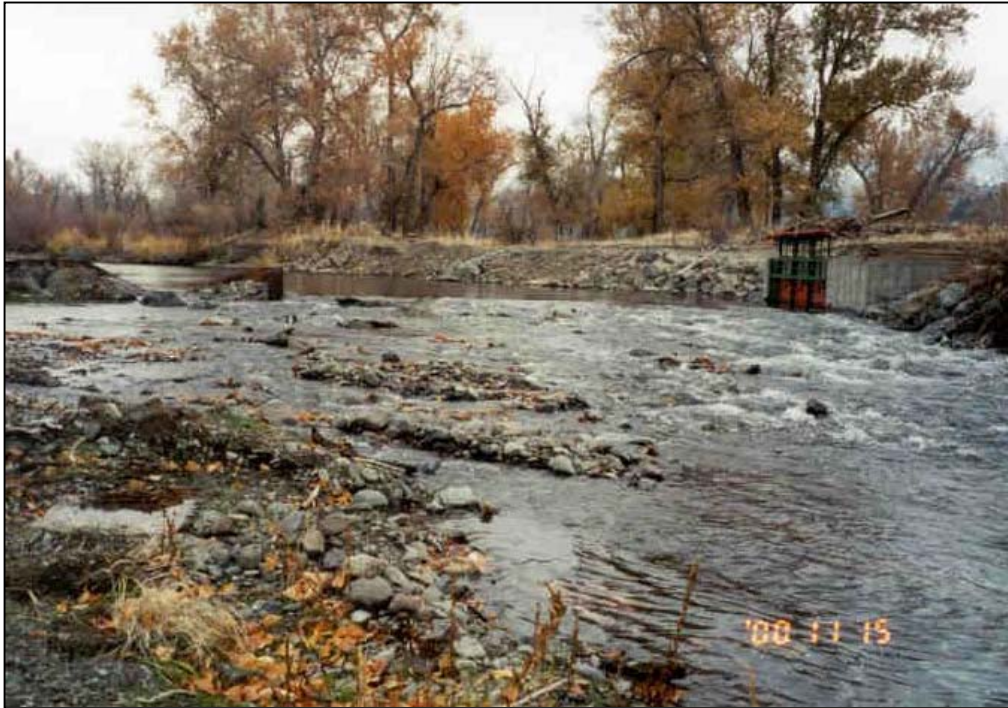
**Monitoring Elements:**

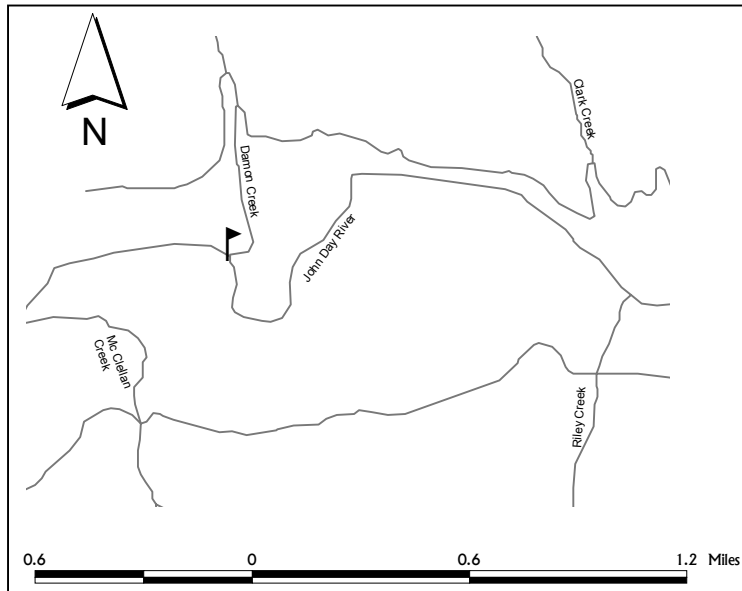
1. Evaluate channel and riverbank structure, using channel cross sections, along approximately 100 meters of river beginning immediately above the old diversion dam. This assessment will be compared to the original engineering survey (if applicable) to determine extent and rate of channel correction.
2. Photo 3. Post-project photo of Fields Infiltration Gallery
3. Establish permanent photo-point locations (using GPS and field markers), using pre-project photo locations where appropriate, to visually evaluate channel and riparian recovery.
4. Acquire pre-project photos from the GSWCD; repeat post-project photos.

**Monitoring Completed:**

1. Pre-project photos have been acquired from the GSWCD.

Project Cost:	Local Cost Share	29,463	(49%)
	BPA Contribution	<u>30,600</u>	(51%)
	TOTAL	\$ 60,063	

Start Date: February 1995Completion Date: Project remains active.**Photo 5. Post-project photo of the Enterprise diversion**

**PROJECT: LEE IRRIGATION CONVERSION****Grantee: Grant Soil and Water Conservation District****Figure 10. Lee Project Location Map**

Background: The Lee Irrigation Conversion Project is located approximately three miles west of Mt. Vernon at RM 235. The project area consists of 35 acres of hay meadow adjacent to the John Day River, irrigated with a .88 cfs water right. Historically, Panama ditch water was diverted using a gravel push-up diversion into an irrigation delivery system consisting of a system of open field ditches and canal. Material used in the diversion dam was excavated as needed from the riverbed and was left in place following the end of the irrigation season. Seasonally high flows typically washed the diversion away causing it to be rebuilt annually.

Sporadic summer storm events and gradual flow reduction caused the dam

to be reconstructed on an irregular basis. The processes of dam construction and reconstruction several times each year led to destabilization of soil tension which increased bedload transport and scouring of the riverbed. The periodic use of heavy equipment in the river for maintenance and construction may have resulted in additional streambank/bed and riparian destabilization. In addition, the push-up diversion may have been a fish passage impediment or barrier, in particular during periods of low river flow.

The open water distribution system resulted in high conveyance losses and caused continual maintenance of the field ditches. Uneven field topography and water distribution led to patterns of undesirable grass species (lowering hay production) and areas of the meadow which were too wet to mow.

The project area is located within the anadromous migratory corridor.

**Objectives:**

1. Reduce the overall number of diversions in the John Day basin and eliminate a potential fish passage obstruction within the project area.
2. Enhance instream flows within and downstream of the project area by increasing irrigation efficiency, decreasing overall diversion rates, reducing conveyance losses, and by moving the point of diversion seven miles downstream from the existing point of diversion.
3. Eliminate direct impacts to riparian areas and streambed/banks (and resulting indirect impacts) associated with the annual and periodic reconstruction of the push-up diversion, thereby enhancing channel stability.
4. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversions.
5. Reduce the Oregon Department of Fish and Wildlife's ongoing screen maintenance effort.
6. Enhance agricultural yields and reduce overhead costs associated with irrigation management.

**Project Description:**

1. Move the diversion point approximately seven miles downstream of the present diversion point.
2. Install a 15 HP electric pump, with screened intake, at the new pumping facility (pump pad, electric panel, etc).
3. Install a system of buried mainlines using 3700 feet of 3-4 inch high-pressure PVC pipe with riser outlets every 50-60 feet.
4. Assemble one 4" wheel line with mover and three 3" hand lines.

**Monitoring:**

**Monitoring Objective:** Determine overall water use in the new irrigation system.

**Monitoring Elements:**

1. Determine whether landowner is monitoring irrigation rates and whether pre-project data exists.
2. Photo 3. Post-project photo of Fields Infiltration Gallery
3. Establish permanent photo-point locations (using GPS and field markers), using pre-project photo locations where appropriate, to visually evaluate channel and riparian recovery.
4. Acquire pre-project photos from the GSWCD; repeat post-project photos.

**Monitoring Completed:**

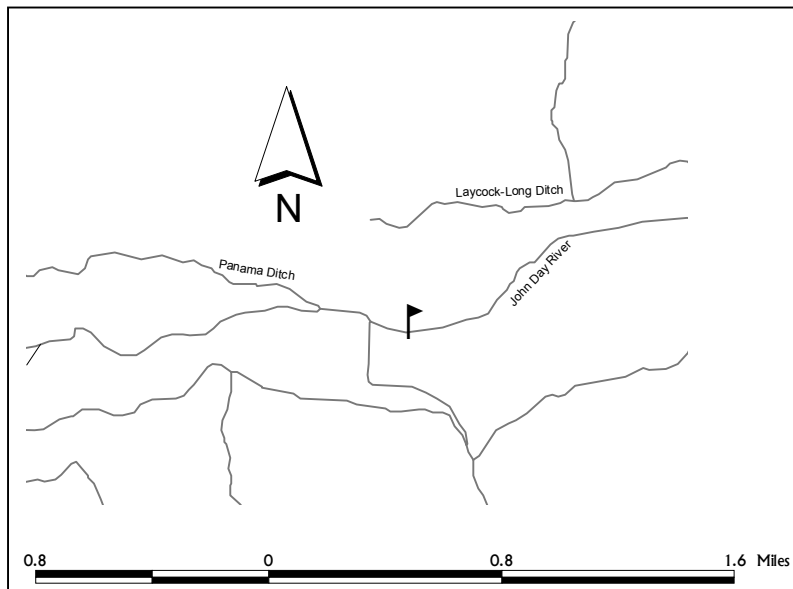
1. Pre- and post-project photos have been acquired from the GSWCD.

Project Cost:	Local Cost Share	31,027	(45%)
	BPA Contribution	<u>37,740</u>	(55%)
	TOTAL	\$ 68,767	

Start Date: September 1998

Completion Date: April 1999



**PROJECT: PIKE IRRIGATION CONVERSION & PUMPING STATION****Grantee: Grant Soil and Water Conservation District****Figure 11. Pike Project Location Map**

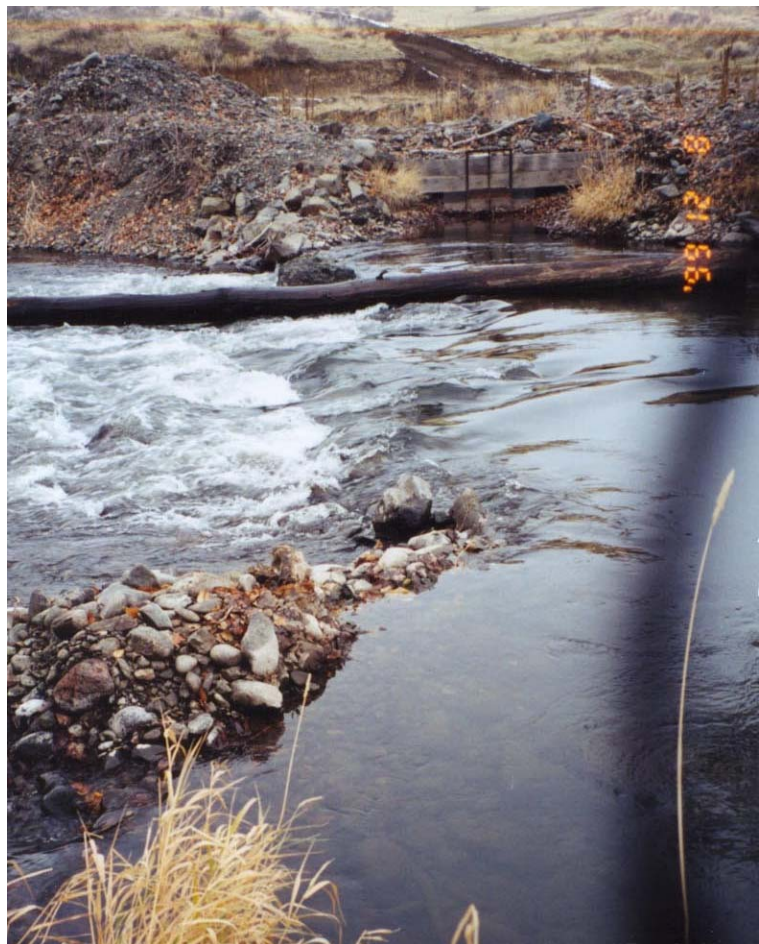
**Background:** The Pike Irrigation Conversion and Pumping Station Project is located approximately three miles west of John Day at RM 245.3. Historically, Laycock-Long ditch water was diverted from the John Day River, using a gravel push-up diversion, into an irrigation delivery system consisting of a system of open field ditches. Material used in the diversion dam was excavated as needed from the riverbed and was left in place after the end of the irrigation season. Seasonally high flows typically washed the diversion away causing it to be rebuilt annually. Sporadic summer storm events and gradual flow reduction caused the dam to be reconstructed on an irregular basis.

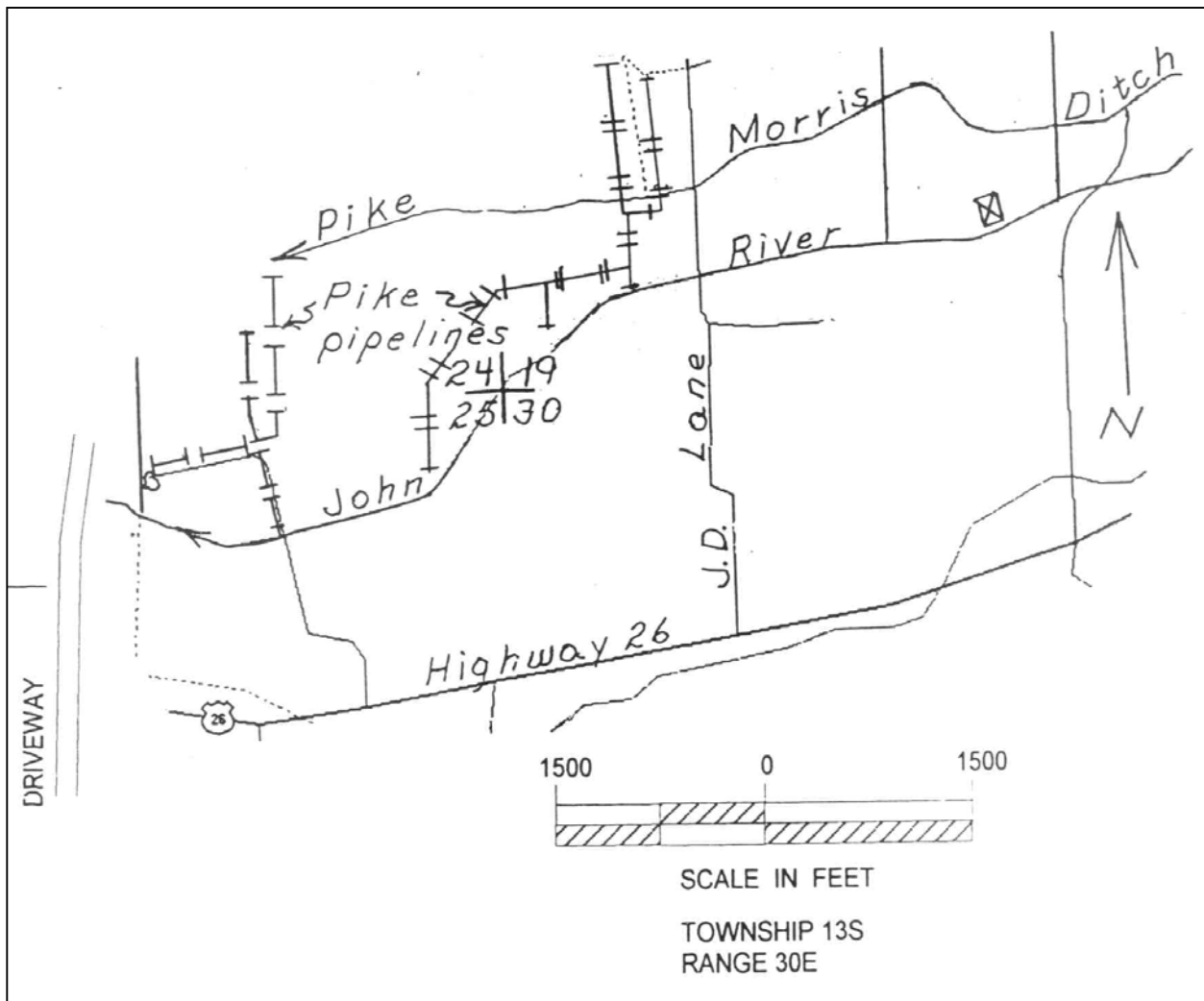
The processes of dam construction

and reconstruction several times each year led to destabilization of soil tension which increased bedload transport and scouring of the riverbed. The periodic use of heavy equipment in the river for maintenance and construction may have resulted in additional streambank/bed and riparian destabilization. In addition, the push-up diversion may have been a fish passage impediment or barrier, in particular during periods of low river flow.

The open water distribution system resulted in high conveyance losses and caused continual maintenance of the field ditches.<sup>iii</sup> Uneven field topography and water distribution led to patterns of undesirable grass species (lowering hay production.

The Pike project area is within the anadromous migratory corridor and within migratory/overwintering habitat for bull trout, westslope cutthroat and redband trout. This river reach is also likely to contain late spring–early summer rearing habitat for juvenile anadromous species.

**Photo 6. Pre-project photo of Morris/Pike Diversion**



**Figure 12. Pike project facilities map**

**Objectives:**

1. Reduce the overall number of diversions in the John Day basin and eliminate a potential fish passage obstruction within the project area.
2. Enhance instream flows within and downstream of the project area by increasing irrigation efficiency, decreasing overall diversion rates, reducing conveyance losses, and by moving the point of diversion 1.8 miles downstream from the existing point of diversion.
3. Eliminate direct impacts to riparian areas and streambeds/banks (and resulting indirect impacts) associated with the annual and periodic reconstruction of the push-up diversion, thereby enhancing channel stability.
4. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversion.
5. Reduce the Oregon Department of Fish and Wildlife's ongoing screen maintenance effort.
6. Enhance agricultural yields and reduce overhead costs associated with irrigation management.

**Project Description:**

1. Move the point of diversion approximately 1.8 river miles downstream near the point of application.
2. Install two systems of buried mainlines using 9,310 feet of 5-inch PVC high-pressure pipe.
3. Assemble 7 wheellines with movers and handline.
4. Construct two pump pads, install electric panels and assemble pump systems with screened intakes.

**Photo 7. Pike Pumping Station**

5. Plant grasses and hardwoods on both banks to increase rates of recovery.

**Monitoring:**

**Monitoring Objective:** Evaluate the rate of channel and riparian recovery at the old diversion.

**Monitoring Elements:**

1. Evaluate channel and riverbank structure, using channel cross sections, along approximately 100 meters of river beginning immediately above the old diversion dam. This assessment will be compared to the original engineering survey (if applicable) to determine extent and rate of channel correction.
2. Photo 3. Post-project photo of Fields Infiltration Gallery
3. Establish permanent photo-point locations (using GPS and field markers), using pre-project photo locations where appropriate, to visually evaluate channel and riparian recovery.
4. Take pre-project photos and repeat as necessary.
5. Evaluate conveyance losses on the existing ditch.

**Monitoring Completed:**

1. Eight transects were located permanently in the field and pre-project cross section measurements were completed. Field mapping was completed concurrently with cross section measurements.
2. Permanent photo-point locations have been established in the field.
3. Pre- and post-project photos have been acquired from the GSWCD.
4. Conveyance losses on the historic ditch have been calculated.

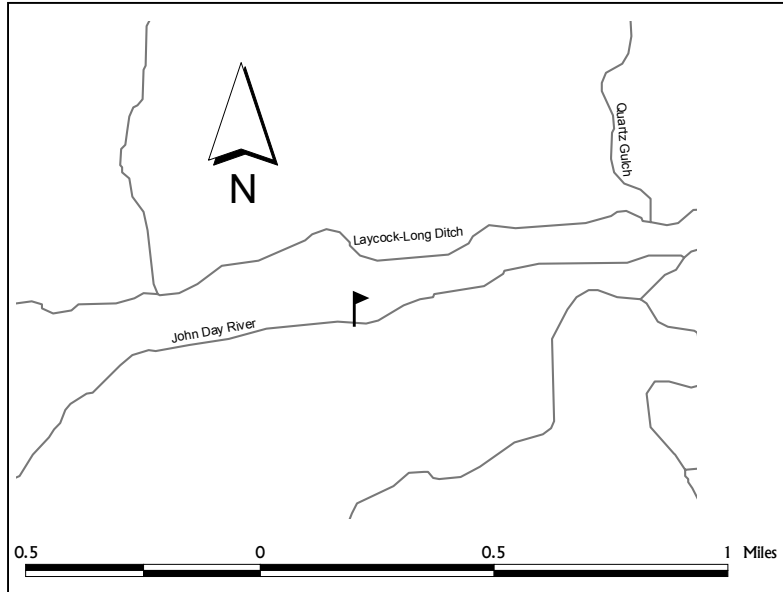
**Project Cost:**

Local Cost Share	118,289	(72%)
BPA Contribution	46,065	(28%)
<b>TOTAL</b>	<b>\$ 164,354</b>	



Start Date: April 1995Completion Date: May 2000**PROJECT: MORRIS IRRIGATION CONVERSION & PUMPING STATION**

Grantee: Grant Soil and Water Conservation District

**Figure 13. Morris Project Location Map**

Background: The Morris Irrigation Conversion and Pumping Station Project is located approximately three miles west of John Day at RM 244.

The Morris Project historically used the same diversion structure as in the Pike Project. For a complete discussion of this diversion, see the description of the Pike Project above. Conveyance losses to the upstream boundary of the Morris property were also significant.<sup>iv</sup>

Objectives: Covered under the Pike Project description.

**Project Description:**

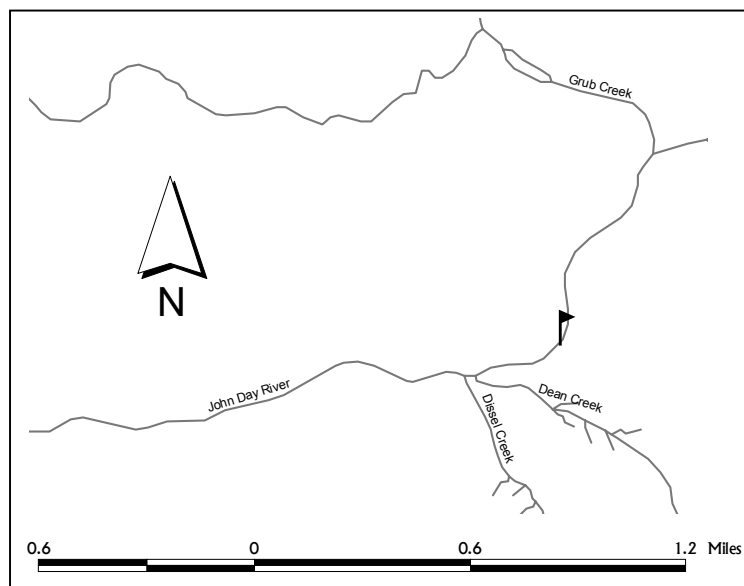
1. Move the point of diversion approximately 1.5 miles downstream, near the point of application.
2. Install approximately 60 feet of high-pressure, 4-inch PVC buried mainline and connect to the existing buried line.
3. Assemble four, 4" wheelines with movers.
4. Move point of diversion 1.5 miles downstream.
5. Construct a pump pad and assemble pump system with screen intake.
6. Plant grasses and hardwoods on both banks to increase rates of recovery.

**Monitoring:**

Covered under the Pike Project.

**Photo 8. Morris Wheelline**

Project Cost:	Local Cost Share	34,525	(52%)
	BPA Contribution	31,781	(48%)
	<b>TOTAL</b>	<b>\$ 66,306</b>	

Start Date: April 1995Completion Date: December 1999**PROJECT: CROWN RANCH DIVERSION****Grantee: Grant Soil and Water Conservation District****Figure 14. Crown Ranch Project Location Map**

**Background:** The Crown Ranch Diversion Project is located approximately five miles east of John Day at RM 253.5. Historically, irrigation water was diverted into an open canal by constructing a gravel dike across the John Day River. The project area consists of 115 acres, which receives 2.78 cfs during the irrigation season.

Dike material was excavated from the river and streambeds and the dam was left in place following the end of the irrigation season. Subsequent high flows typically washed the dike away causing it to be rebuilt the following irrigation season. Annual flow reduction caused the dam to be rebuilt sporadically throughout the irrigation season. The process of dike

reconstruction several times per year caused a gradual lowering of the riverbed. When it became difficult to obtain sufficient material to rebuild the dike, and as the streambed lowered, the diversion point was moved upstream. The latest diversion point was several hundred feet or more upstream from the designated point of diversion. This resulted in destabilization of the streambanks, river bed, and riparian area along a significant length of stream.

This project is located within anadromous migratory habitat and

**Photo 9. Pre-project photo of Crown Ranch Diversion**

may include limited spawning areas for spring chinook. In addition, this river reach contains known migratory—overwintering habitat for bull trout, westslope cutthroat, and redband trout. It also likely provides late spring—early summer juvenile rearing habitat for anadromous species.

**Objectives:**

1. Reduce the overall number of diversions in the John Day basin and eliminate a potential fish passage obstruction within the project area.
2. Eliminate direct impacts to riparian areas and streambed/banks (and resulting indirect impacts) associated with the annual and periodic reconstruction of the push-up diversion, thereby enhancing channel stability.
3. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversion.
4. Reduce overhead costs associated with irrigation management.

**Project Description:**

1. Install a permanent concrete and rock diversion structure at the existing ditch head, which is the legal point of diversion.
2. Construct a concrete turnout box and spillway, incorporating a trash screen to protect the turnout box, a headgate for water regulation and a water-measuring weir as appropriate.
3. Install layflat stanchions in spillway to allow for placement of flashboards that regulate impounded water level during the irrigation season.
4. Place approximately 200 cubic yards of 36 inch minus riprap in conjunction with sheet steel piling in the bed of the river on grade relative to point of diversion to ensure flow over the fishway under all normally occurring river levels.
5. Incorporate the existing hydraulically powered fish wheel into the diversion system.
6. Stabilize the east and west banks of the stream as necessary with riprap to protect the installation and shape spoils on both banks.
7. Plant grasses and hardwoods on both banks to increase rates of recovery

**Monitoring:**

**Monitoring Objective:** Evaluate the rate of channel and riparian recovery at the old diversion.

**Monitoring Elements:**

1. Evaluate channel and riverbank structure, using channel cross sections, along approximately 100 meters of river beginning immediately above the old diversion dam. This assessment will be compared to the original engineering survey (if applicable) to determine extent and rate of channel correction.
2. Photo 3. Post-project photo of Fields Infiltration Gallery
3. Establish permanent photo-point locations (using GPS and field markers), using pre-project photo locations where appropriate, to visually evaluate channel and riparian recovery.
4. Acquire pre-project photos from the GSWCD; repeat post-project photos.

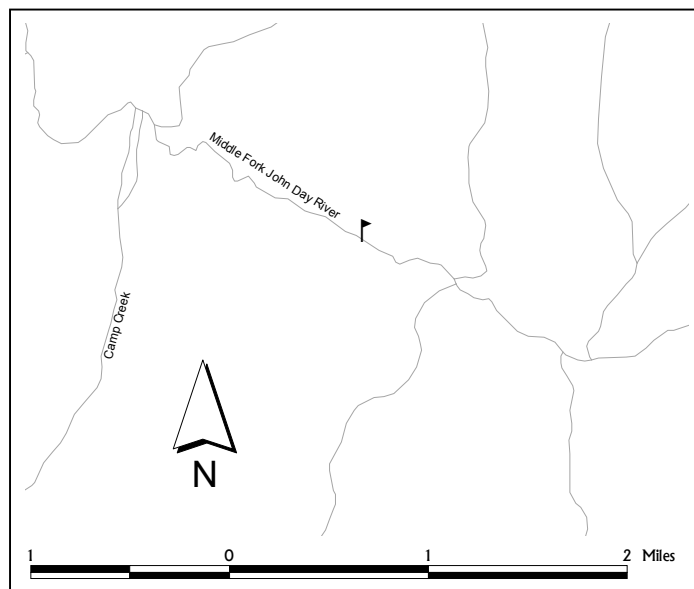
**Monitoring Completed:**

1. Eight transects were located permanently in the field and pre-project cross section measurements were completed. Field mapping was completed concurrently with cross section measurements.



3. Permanent photo-point locations have been established in the field.
4. Pre- and post-project photos have been acquired from the GSWCD.

Project Cost:	Local Cost Share	24,197	(53%)
	BPA Contribution	21,085	(47%)
	<b>TOTAL</b>	<b>\$ 45,282</b>	

Start Date: July 1997Completion Date: Project is active.**PROJECT: HOLMES PIPELINE****Grantee: Grant Soil and Water Conservation District**

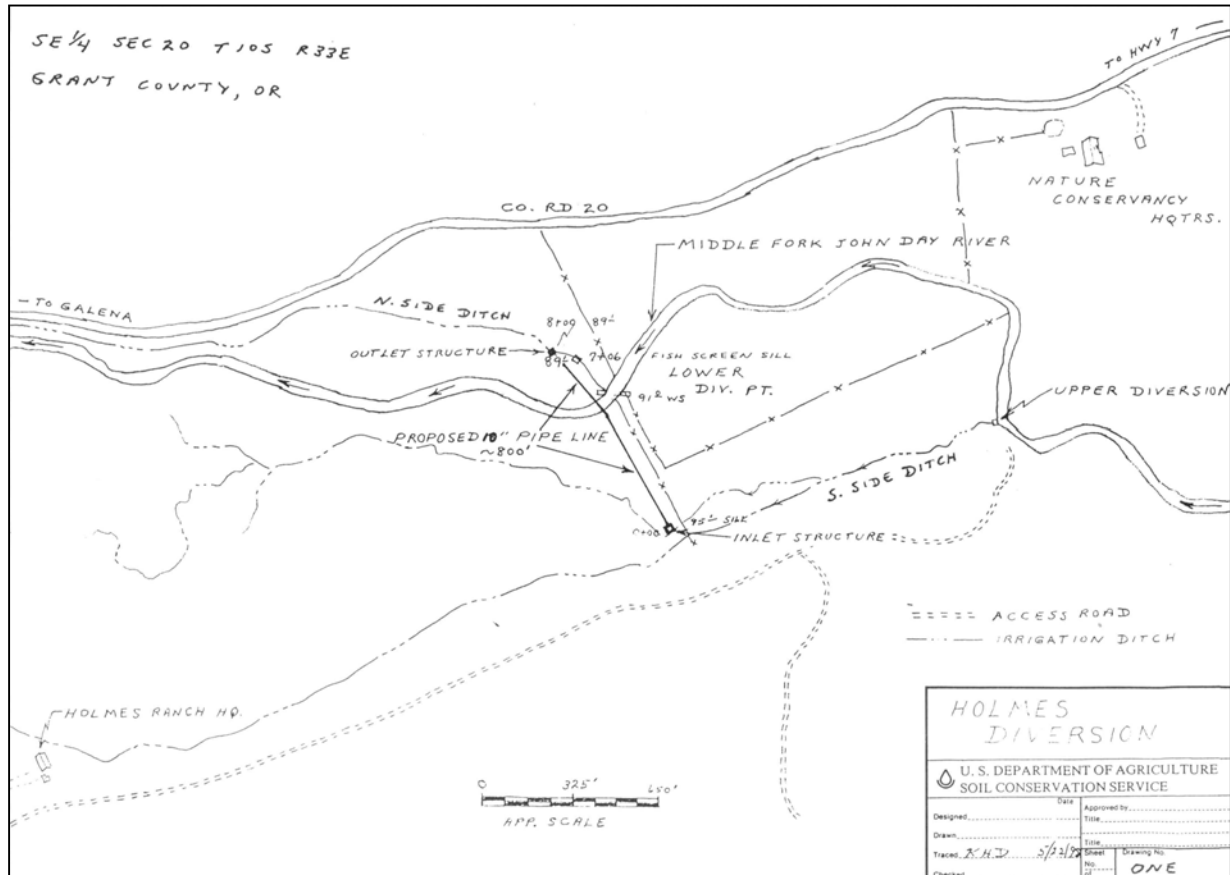
Background: The Holmes Pipeline Project is located approximately 3.0 miles east of Galena at RM 48.5 of the Middle Fork John Day River. Historically, irrigation water was diverted into an open canal by constructing a gravel dike across the Middle Fork. The project area consists of 91 acres, which receives 2.27 cfs during the irrigation season. Dike material was excavated from the river and streambeds and the dam was left in place following the end of the irrigation season. Subsequent high flows typically washed the dike away causing it to be rebuilt the following irrigation season. Annual flow reduction caused the dam to be rebuilt sporadically throughout the irrigation season.

The process of dike reconstruction several

**Figure 15. Holmes Project Location Map****Photo 10. Pre-project photo of Holmes Diversion**

times per year caused a gradual lowering of the riverbed. When it became difficult to obtain sufficient material to rebuild the dike, and as the streambed lowered, the diversion point was moved upstream. The latest diversion point was several hundred feet or more upstream from the designated point of diversion. This resulted in destabilization of the streambanks, river bed, and riparian area along a significant length of stream.

**Figure 16. Holmes project facilities map**



Dike Material is excavated from the riverbed and the dike is left in place following the end of the irrigation season. Subsequent high flows typically wash the dike away causing it to be rebuilt the following irrigation season. The process of dike reconstruction, often several times per year causes a gradual lowering of the riverbed. This method of diversion practice requires periodic use of heavy equipment in the river to perform maintenance.

This reach of the Middle Fork is within spawning, migration, and early summer rearing habitat for spring chinook and the migratory corridor for summer steelhead. In addition, it is likely migratory habitat for adjacent metapopulations of bull trout.

#### Objectives:

1. Reduce the overall number of diversions in the John Day basin and eliminate a potential fish passage obstruction within the project area.
2. Eliminate direct impacts to riparian areas and streambed/banks (and resulting indirect impacts) associated with the annual and periodic reconstruction of the push-up diversion, thereby enhancing channel stability.
3. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversion.

**Photo 11. Holmes pipeline crossing during excavation**

4. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversion.
5. Reduce overhead costs associated with irrigation management.



**Project Description:**

1. Install approximately 850 feet of 10-inch PVC pipe from the south side conveyance ditch under the Middle Fork John Day River to the north side conveyance ditch.
2. Install a turnout box with debris screens and shutoff valve at the south side pipe intake station.
3. Install new headgates at the remaining point of diversion on the south ditch.
4. Install a 36 inch culvert in the south side ditch to allow access to the headgate structure along the ditch easement.
5. Shape materials at the abandoned diversion site (north side ditch) to stabilize the stream banks.
6. Plant grasses and hardwoods on both banks to increase rates of recovery.

**Monitoring:**

**Monitoring Objective:** Evaluate the rate of channel and riparian recovery at the old diversion.

**Monitoring Elements:**

1. Evaluate channel and riverbank structure, using channel cross sections, along approximately 100 meters of river beginning immediately above the old diversion dam. This assessment will be compared to the original engineering survey (if applicable) to determine extent and rate of channel correction.
2. Photo 3. Post-project photo of Fields Infiltration Gallery
3. Establish permanent photo-point locations (using GPS and field markers), using pre-project photo locations where appropriate, to visually evaluate channel and riparian recovery.
4. Acquire pre-project photos from the GSWCD; repeat post-project photos.

**Monitoring Elements:**

1. Eight transects were located permanently in the field and pre-project cross section measurements were completed. Field mapping was completed concurrently with cross section measurements.
2. Cross sections have been entered into AutoCad for analysis.
3. Permanent photo-point locations have been established in the field.

4. Pre- and post-project photos have been acquired from the GSWCD.

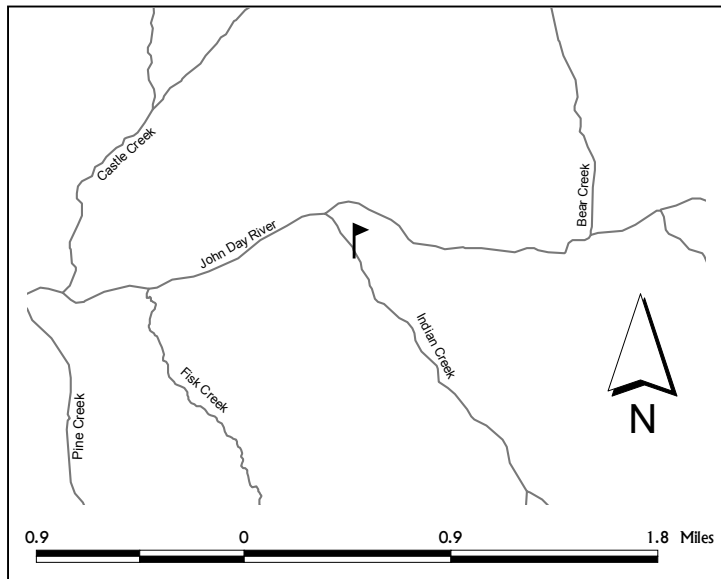
Project Cost:	Local Cost Share	21,511	(54%)
	BPA Contribution	<u>18,535</u>	(46%)
	TOTAL	\$ 40,046	

Start Date: June 1998

Completion Date: October 1998

## PROJECT: RUDISHAUSER INFILTRATION GALLERY

Grantee: Grant Soil and Water Conservation District



**Figure 17. Rudishauser Project Location Map**

Background: The Rudishauser Infiltration Gallery Project is located approximately 5.0 miles west of the town of Prairie City. The project area consists of 75 acres of hay meadow adjacent to the John Day River. Historically, water from the Rudishauser Ditch was diverted from Indian Creek, using a gravel push-up diversion, into an irrigation delivery network consisting of a system of open field ditches. Material used in the diversion dam was excavated as needed from the riverbed and was left in place after the end of the irrigation season.

Seasonally high flows typically washed the diversion away causing it to be rebuilt annually. Sporadic summer storm events and gradual flow reduction in the river caused the dam to be reconstructed

on an irregular basis. The processes of dam construction and reconstruction several times each year led to destabilization of soil tension which increased bedload transport and scouring of the riverbed. The periodic use of heavy equipment in the river for maintenance and construction may have resulted in additional streambank/bed and riparian destabilization. In addition, the diversion may have been a fish passage impediment or barrier, in particular during periods of low river flow.

The project area is within migratory/overwintering habitat for bull trout, westslope cutthroat, and redband trout and within the migratory corridor for summer steelhead. It is also likely to contain early summer juvenile rearing habitat for anadromous species and provide a migratory corridor for juvenile salmonids moving into Indian Creek to escape elevated summer water temperatures in the mainstem John Day River.

### Objectives:

1. Reduce the overall number of diversions in the John Day basin and eliminate a potential fish passage obstruction within the project area.
2. Eliminate direct impacts to riparian areas and streambed/banks (and resulting indirect impacts) associated with the annual and periodic reconstruction of the push-up diversion, thereby enhancing channel stability.



3. Eliminate riverbed scouring and modifications to the hydraulic gradient of the river from the annual washout of the push-up diversion.
4. Reduce the Oregon Department of Fish and Wildlife's ongoing screen maintenance effort.
5. Reduce overhead costs associated with irrigation management.

**Project Description:**

1. Install two 12-inch Vee Wire well screens (80 feet total).
2. Bed screens with clean 5-inch minus river rock.
3. Install two valve stations, each containing one valve assembly and one 6-inch PVC riser assembly.
4. Install approximately 300 feet of 12-inch PVC pipe from the valve stations exiting at the existing open conveyance ditch.
5. Install two valve stations in the 12-inch PVC line on the northeast side of Indian Creek to allow regulation of flow (excess back to the creek).
6. Install rock and earth plug in existing open conveyance ditch at the upstream end at the creek.
7. Seed all disturbed areas.

**Monitoring:**

**Monitoring Objective:** Evaluate the general rate of channel and riparian recovery.

**Monitoring Elements:**

1. Evaluate channel and riverbank structure, using channel cross sections, along approximately 100 meters of river beginning immediately above the old diversion dam. This assessment will be compared to the original engineering survey (if applicable) to determine extent and rate of channel correction.
2. Photo 3. Post-project photo of Fields Infiltration Gallery
3. Establish permanent photo-point locations (using GPS and field markers), using pre-project photo locations where appropriate, to visually evaluate channel and riparian recovery.
4. Acquire pre-project photos from the GSWCD; repeat post-project photos.

**Monitoring Completed:**

1. Eight transects were located permanently in the field and pre-project cross section measurements were completed. Field mapping was completed concurrently with cross section measurements.

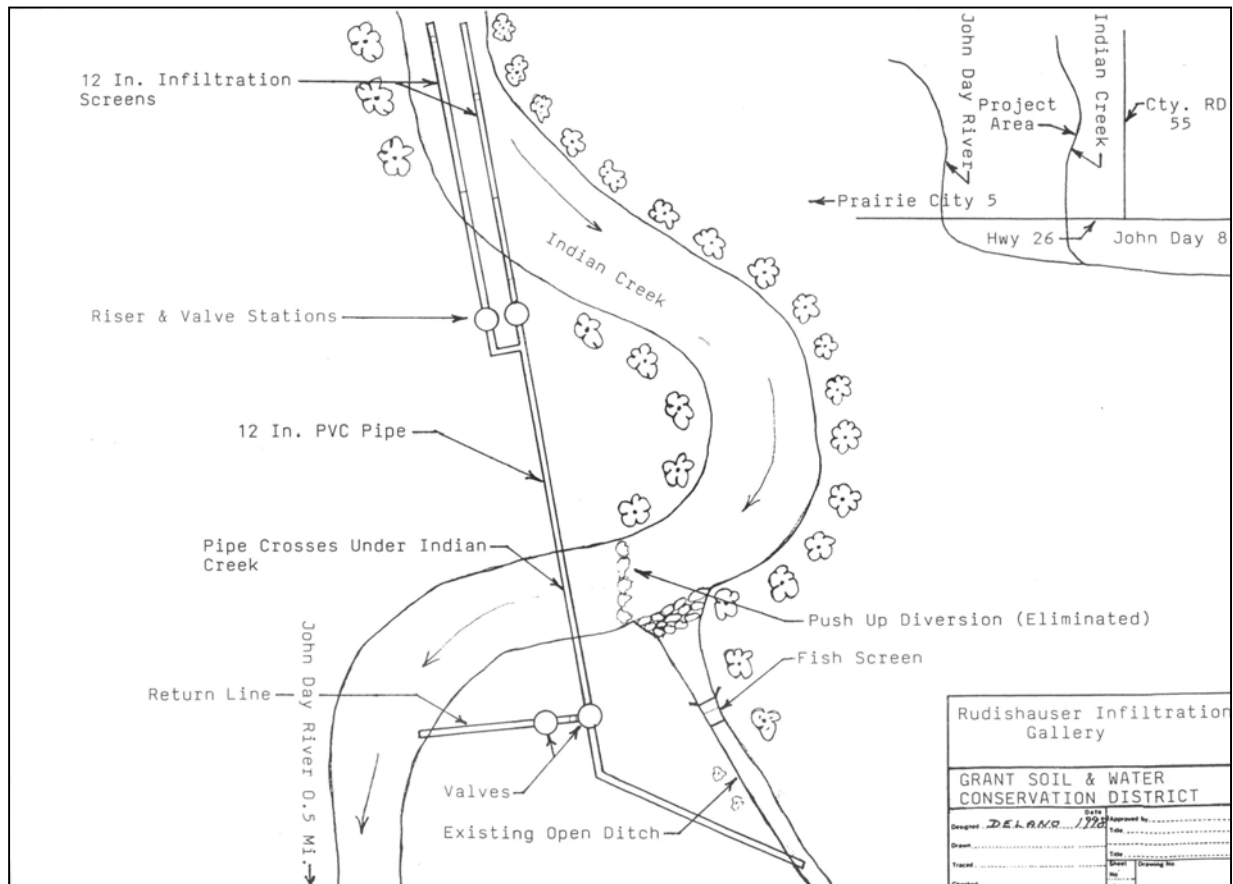


**Photo 12. Rudishauser well screens during excavation**



3. Permanent photo-point locations have been established in the field.
4. Pre- and post-project photos have been acquired from the GSWCD.

Project Cost:	Local Cost Share	14,464	(50%)
	BPA Contribution	14,523	(50%)
	TOTAL	\$ 28,987	

Start Date: July 1998Completion Date: August 1998**Figure 18. Rudishauser project facilities map**

**Attachment 1****FISCAL YEAR 1998 PROJECT BUDGETS**

TOTAL PROJECT BUDGETS	Field Tailwater Reuse	Page Conversion	Clausen Conversion	Rudishauser Diversion	Morris Diversion	Lee Conversion	Crown Ranch Diversion	Holmes Diversion	Enterprise Diversion	Pike Irrigation	
<b>IMPLEMENTATION</b>											<b>FY 1998 TOTAL</b>
	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	
Administration	\$8,450.00	\$3,000.00	\$6,919.00	\$8,124.00	\$11,200.00	\$ 14,062	\$ 10,674	\$ 9,778	\$ 11,053	\$ 17,500	\$ 100,760
Equipment	\$13,878.00	\$36,586.00	\$15,100.00	\$2,770.00	\$26,942.00	\$ 13,790	\$ -	\$ -	\$ -	\$ 46,523	\$ 155,589
Equipment Rental	\$0.00	\$0.00	\$0.00	\$3,720.00	\$1,084.00	\$ -	\$ 5,850	\$ 5,900	\$ 9,225	\$ 8,477	\$ 34,256
Labor	\$0.00	\$0.00	\$0.00	\$800.00	\$45.00	\$ 225	\$ 3,573	\$ 3,573	\$ 4,045	\$ 25,150	\$ 37,411
Other	\$68,082.00	\$63,240.00	\$71,460.00	\$800.00	\$23,280.00	\$ 16,965	\$ 800	\$ 800	\$ 950	\$ 5,896	\$ 252,273
Supplies	\$58,660.94	\$12,666.00	\$3,435.00	\$6,773.00	\$1,865.00	\$ 2,928	\$ 13,985	\$ 9,595	\$ 30,695	\$ 45,408	\$ 186,011
Subcontract Construction	\$15,164.00	\$21,400.00	\$19,658.00	\$6,000.00	\$1,890.00	\$ 20,797	\$ 10,400	\$ 10,400	\$ 4,095	\$ 15,400	\$ 125,204
<b>Total Project Cost</b>	<b>\$164,235</b>	<b>\$136,892</b>	<b>\$116,572</b>	<b>\$28,987</b>	<b>\$66,306</b>	<b>\$ 68,767</b>	<b>\$ 45,282</b>	<b>\$ 40,046</b>	<b>\$ 60,063</b>	<b>\$ 164,354</b>	<b>\$ 891,504</b>

COST SHARE PERCENTAGES	Field Tailwater Reuse	Page Conversion	Clausen Conversion	Rudishauser Diversion	Morris Conversion	Lee Conversion	Crown Ranch Diversion	Holmes Diversion	Enterprise Diversion	Pike Irrigation	<b>FY 1998 TOTAL</b>
<b>IMPLEMENTATION</b>											
<b>Total Project Cost</b>	<b>\$164,235</b>	<b>\$136,892</b>	<b>\$116,572</b>	<b>\$ 28,987</b>	<b>\$ 66,306</b>	<b>\$ 68,767</b>	<b>\$ 45,282</b>	<b>\$ 40,046</b>	<b>\$ 60,063</b>	<b>\$ 164,354</b>	<b>\$ 891,504</b>
Local Cost Share	(\$114,075)	(\$107,052)	(\$96,572)	\$ (14,464)	\$ (34,525)	\$ (31,027)	\$ (24,197)	\$ (21,511)	\$ (29,463)	\$ (118,289)	\$ (591,175)
Percent Cost Share	69%	78%	83%	50%	52%	45%	53%	54%	49%	72%	66%
Balance	\$50,160	\$29,840	\$20,000	\$ 14,523	\$ 31,781	\$ 37,740	\$ 21,085	\$ 18,535	\$ 30,600	\$ 46,065	\$ 300,329
Total BPA Request	(\$50,160)	(\$29,840)	(\$20,000)	\$ (14,523)	\$ (31,781)	\$ (37,740)	\$ (21,085)	\$ (18,535)	\$ (30,600)	\$ (46,065)	\$ (300,329)
Percent Cost Share	31%	22%	17%	50%	48%	55%	47%	46%	51%	28%	34%

## **ENDNOTES**

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<sup>i</sup> Personal communication with Richard Page (10/20/99).

<sup>ii</sup> Harrelson C.C., C.L. Rawlins, and J.P. Potyondy. 1994. Stream channel reference sites: an illustrated guide to field technique. USDA Forest Service, Gen. Tech. Rpt. RM-245.

<sup>iii</sup> Ditch losses from the point of diversion to the upper boundary of the project area have been estimated at 73.3% or 1.84 cfs (S. Robertson, unpub. Data).

<sup>iv</sup> Ditch losses from the point of diversion to the upper boundary of the property have been estimated at 27% or 1.55 cubic feet per second (S. Robertson, unpub. data).